

# CUPOLA FURNACE FUNDAMENTALS

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## Learning made Simple, Visual, and Interactive

This course will concentrate on cupola furnaces, specifically on extended campaign, water-cooled cupolas using conventional fuels and their diverse components. Since the 1980s, these cupolas have become the most commonly used production cupolas in United States foundries. Several of the various items to be discussed will include the parts of the cupola, its ancillary systems, assistive devices and instrumentation, the fuels used, and the different charge materials.

Credit Hours **6**

## Learning Objectives

- Identify all of the parts, ancillary systems, and assistive devices and instrumentation of the cupola and discuss their individual functions.
- Understand how each element of the cupola furnace works together as a whole during a cupola operation.
- Distinguish between the primary fuels and secondary fuels of a cupola and recognize how they each affect the melting process.
- Differentiate between the three main categories of charge materials and demonstrate an understanding of why the charge materials are added.

## Table of Contents

### I. Cupola Components

- **Parts of the Cupola**
- **Ancillary Systems**
  - o Exhaust System
  - o Charge Weighing System
  - o Blast Air System
  - o Molten Metal Handling System
- **Assistive Devices & Instrumentation**
  - o Refractory Installation Tools
  - o Cleaning and Removal Tools
  - o Safety Devices
  - o Measuring Instrumentation

### II. Cupola Fuels

- **Primary Fuels**
  - o Foundry Fuels
  - o Air
  - o Formed Coke
- **Secondary Fuels**
  - o Anthracite Coal
  - o Oxygen Enrichment
  - o Injected Fuels
  - o Oxy-Fuel Burners

### III. Cupola Charge Materials

- **Charge Metallics**
  - o Size
  - o Chemical Composition
  - o Appearance
- **Fluxes**
  - o Amount
  - o Primary Fluxes
  - o Secondary Fluxes
- **Alloy Materials**
  - o Analysis
  - o Size
  - o Weighing
  - o Melt Losses
  - o Silicon Carbide

